

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁷ :

A47L 9/24

A1

(11) International Publication Number:

WO 00/08997

(43) International Publication Date:

24 February 2000 (24.02.00)

(21) International Application Number: PCT/KR99/00062

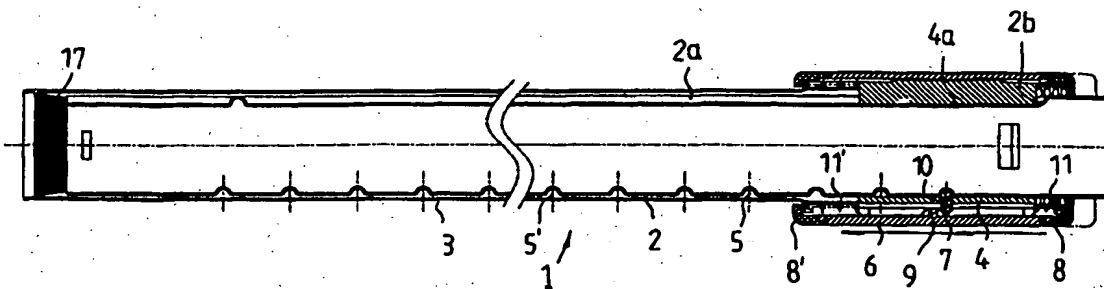
(22) International Filing Date: 9 February 1999 (09.02.99)

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Pusan 611-085 (KR).(81) Designated States: AT, AU, BG, BR, CA, CH, CN, CU, CZ,
DE, DK, ES, FI, GB, HU, ID, IL, IS, JP, KP, KZ, LK, LU,
MN, MX, NO, NZ, PL, PT, RO, RU, SE, SG, SK, TR, UZ,
VN, YU, European patent (AT, BE, CH, CY, DE, DK, ES,
FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).

Published

*With international search report.**With amended claims and statement.**Upon the request of the applicant, before the expiration of
the time limit referred to in Article 21(2)(a).*

(54) Title: A SUCTION PIPE OF A VACUUM CLEANER



(57) Abstract

The present invention is related to a suction pipe of a vacuum cleaner which is convenient in using by arbitrarily stretching and controlling the length of the suction pipe which is combined with a vacuum cleaner in order to suction waste materials such as dust, etc. into the vacuum cleaner. The present device is characterized by its more compact and stable operational structure, in which the length of the suction pipe may be controlled arbitrarily. In the suction pipe of a vacuum cleaner of the present device, the length of the suction pipe may be controlled arbitrarily by inserting or drawing out the out pipe from the inner pipe by elastically combining sliders to the outer side of an out pipe in the lengthwise direction, moving sliders to any one direction to detach stoppers from control homes of the inner pipe, and combining stoppers with control homes of the inner pipe when sliders are returned to their original locations.

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A Suction Pipe of a Vacuum Cleaner

Technical Field

The present invention relates to a suction pipe of a vacuum cleaner, particularly to a suction pipe of a vacuum cleaner which is convenient in using by having the length of a suction pipe, which is connected to a vacuum cleaner and suctions dust and other materials into a vacuum cleaner, selected and controlled arbitrarily.

Background Art

Conventional vacuum cleaners have performed cleaning by forcefully drawing out waste materials such as dust, etc. through a suction pipe by using the vacuum suction force. Suction pipes of such vacuum cleaners have had a fixed length or their constitutional elements have been composed of in the simple separation and combination method making their use by controlling the length as desired by a user according to the height of the user, location and part of cleaning, and other conditions very difficult.

In other words, the suction pipe of conventional vacuum cleaners has been composed of two to four pipe bodies in the separation and combination method so that its length may be controlled. However, the suction pipe having such separation combination structure has been disadvantageous in that it is not possible to control its length in detail in many steps, it is not possible to keep the cleaner compactly and to move after using due to the length, and subsequently, volume of the suction pipe, and other aspects.

And there have been many products supplementing the above disadvantages and enhancing more convenience so that the length of a suction pipe may be stretched or controlled arbitrarily. However, they have been disadvantageous in that their operation is unstable, they are not convenient in using due to difficulty in controlling and manipulating the length, their appearances are not very nice due to projection of the control lever, etc. as they are constructed in such a way that the length of the suction pipe may be variably controlled by

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manipulating the control lever, and therefore, the length of the suction pipe is controlled by manipulating the somewhat complicatedly structured control lever.

5 Disclosure of Invention

 An object of the present invention is therefore to solve problems and disadvantages of the suction pipe of conventional vacuum cleaners enabling easy control of the length of the suction pipe as desired by making it relatively simple structured thus
10 increasing convenience in using of the vacuum cleaner and raising competitiveness of the product with improved appearance. Particularly, the present device has a compact-structured control means in order to ensure convenience in using according to the manipulation of control of the length of the suction pipe to the
15 maximum and to provide nice-looking products.

Brief Description of Drawings

 The foregoing and other objects, aspects and advantages will be better understood from the following detailed description of
20 preferred embodiments of the invention with reference to the drawings, in which:

 FIG. 1 is a cross-sectional view of one preferred embodiment of the present device;

 FIG. 2 is an enlarged cross-sectional view of the essential part
25 of the present device;

 FIG. 3 is a transverse cross-sectional view of the present device;

 FIG. 4 is a cross-sectional view of the present device showing its operational state;

30 FIG. 5 is a cross-sectional view of another preferred embodiment of the present device;

 FIG. 6 is an enlarged cross-sectional view of the essential part of the present device of Figure 5; and

 FIGS. 7a and 7b are cross-sectional views of the present
35 device of Figure 5 showing its operational state.

Best Mode for Carrying Out the Invention

FIG. 1 is a cross-sectional view of one preferred embodiment of the present device, and FIG. 2 is an enlarged cross-sectional view of the essential part of the present device. In the suction pipe 1 of a vacuum cleaner in which an inner pipe 2 connected to the vacuum cleaner and an out pipe 3 of which suction inlet is mounted at the end are connected to each other and draw dust and other waste materials out of the suction inlet of the out pipe 3 into the vacuum cleaner, the present device is characterized by that the length of the suction pipe 1 may be controlled arbitrarily by slide-connecting inner and out pipes 2, 3 to stretch and control. The construction of the present device is described in more detail as follows:

A guide pipe 4 is connected to the end of an out pipe 3 which is connected to the outer side of an inner pipe 2 connected to a vacuum cleaner. In the guide pipe 4, a projected part 4a is formed so that the projected part 4a is connected to the concave guide inlet 2a of the inner pipe 2 as it is fixedly inserted into the out pipe 3. In the linear side of the concave guide inlet 2a, a hook 2b is formed so that the projected part 4a of the guide pipe 4 connected to the concave guide inlet 2a is caught by the hook 2b, and the out pipe 3 is not allowed to rotate arbitrarily (avoid idle running) from the inner pipe 2 by the projected part 4a which is connected to the concave guide inlet 2a. In this state, the out pipe 3 and inner pipe 2 slide along the concave guide inlet 2a when they are drawn out or inserted.

A multiple number of control homes 5, 5' are formed in a row in the above inner pipe 2, and the guide pipe 4 is equipped with an elevation ball 10 so that a stopper 7 may move up and down as the stopper 7 passes through control homes 5, 5' of the inner pipe 2. The length of the suction pipe 1 is then controlled according to the position of the inner pipe 2 to be drawn out of the out pipe 3 or inserted as the position of control homes 5, 5', to which the stopper 7 is hooked and connected, is selected by having the stopper 7 installed in the elevation ball 10 hooked and fixed selectively to one of control homes 5, 5' through the elevation ball 10 of the guide pipe

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4.

Also, a slider 6 is connected to the outer side of the guide pipe 4 in which the elevation ball 10 is formed. Caps 8, 8' are connected to both sides of the slider 6, and springs 11, 11' are installed elastically inside of both caps 8, 8'. Formed inside of the slider 6 is a switch 9 which is located on top of the elevation ball to open and close the elevation ball 10. The stopper 7 is then hooked to or released from control homes 5, 5' of the inner pipe 2 as the switch 9 controls up-and-down movement of the stopper 7 which is located in the elevation ball 10.

The slider 6 and caps 8, 8' of both sides in the above are assembled interactively in terms of male and female assembly protrusion 12 and concave assembly home 12a so that the slider 6 and caps 8, 8' of both sides are not rotated idly. And springs 11, 11' which are built in caps 8, 8' of both sides of the slider 6 are supported by a fixture 13 in caps 8, 8' so that springs 11, 11' are stably and elastically combined in the lengthwise direction to support the guide pipe 4 elastically from both sides.

FIG. 5 is a cross-sectional view of another preferred embodiment of the present device, and FIG. 6 is an enlarged cross-sectional view of the essential part of the present device of FIG. 5. As in the above-described one preferred embodiment of the present device, to one end of the out pipe 3 which is connected to the outer side of the inner pipe 2 connected to a vacuum cleaner, a guide pipe 4 is connected in such a way that the length of the suction pipe 1 is stretched and controlled by moving the out pipe 3 from the inner pipe 2 as the guide pipe 4 is moved.

The guide pipe 4 is connected to the out pipe 3 to form the elevation ball 10a through which the roller-type stopper 7a is raised from control homes 5, 5' of the inner pipe 2 and to combine elastically springs 14, 14' to both ends so that the slider 6a which is connected to the outer side of the guide pipe 4 can be moved in the lengthwise direction.

At the center of the above slider 6a, there is an operational part 16 which is composed of catching homes 15, 15' at both sides

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which are elastically supported by the above springs 14, 14' and through which the stopper 7a can be hooked or detached from control homes 5, 5' of the inner pipe 2 as the stopper 7a is raised through the elevation ball 10a when the slider 6a is moved in the right-and-left lengthwise direction. It is therefore possible to control the length of the suction pipe 1 by inserting, drawing out, and stretching the out pipe 3 from the inner pipe 2 by having the stopper 7a hooked to or detached from control homes 5, 5' as the slider 6a is moved.

10 The construction of the present device is illustrated in more detail as follows:

 The above slider 6a is divided into an upper cover 61 and a lower cover 62 which are combined at the outer side of the guide pipe 4, and the central slider 6a of the upper cover 61 is combined within the operational part 16 through elastic support of springs 14, 14' of both sides.

 Catching homes 15, 15' are inserted and formed at both sides of the bottom surface of the above slider 6a so that the stopper 7a is hooked and detached as it is raised from control homes 5, 5' of the inner pipe 2 through the elevation ball 10a. And as in the above-described one embodiment of the present device, caps 8, 8' are combined to both sides of the slider 6a.

 The reference numeral 17 in the figure which is not yet illustrated is a packing pipe.

25 In the present device which is constructed as described in the above, if a slider 6 is operated slidingly in the lengthwise direction, a switch 9 in the slider 6 opens or closes the elevation ball through which a stopper 7, which is hooked and fixed to control homes 5, 5' of an inner pipe 2 when the inner pipe 2 is drawn out of an out pipe 3 or is inserted, is raised as the stopper 7 is detached from control homes 5, 5' as it is moved by drawing out or insertion of the inner pipe 2. If the slider 6 which is moved in one direction is released, the slider 6 is returned to its original position by the restoring force of springs 11, 11' which are elastically combined with caps 8, 8' of both sides. At this time, the switch 9 of the slider 6 closes the

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elevation ball 10, and the stopper 7 which is built in the elevation ball 10 keeps its original position which is hooked and fixed to control homes 5, 5' of any one side of the inner pipe 2 thus enabling arbitrary control of the length of the suction pipe 1 as the inner pipe 2 is drawn out of the out pipe 3 or is inserted. The operation of the present device is then illustrated in more detail as follows:

If the slider 6 slides in any one direction, caps 8, 8' which are combined to both sides of the slider 6 are moved along in the direction of movement of the slider 6, by which springs 11, 11' at one side (opposite side of the direction of movement of the slider 6) in caps 8, 8' formed at both sides are compressed to the guide pipe 4 side which is fixed to the out pipe 3.

If the slider 6 is moved in any one direction, the slider 6 compresses springs 11, 11' of one direction, while the switch 9 opens the elevation ball 10 of the guide pipe 4 as the slider 6 is moved.

Accordingly, if the inner pipe 2 is drawn out of the out pipe 3 (length is reduced) or inserted (length is extended), the stopper 7 which has been hooked to control homes 5, 5' is raised through the elevation ball while overcoming the load of control homes 5, 5' by the moving force of the inner pipe 2.

In other words, the stopper 7 which has been hooked to control homes 5, 5' is raised, as it is released to the circumference of the inner pipe 2 along control homes 5, 5' by the moving force of the inner pipe 2 as the switch 9 of the slider 6 stopping the elevation 10 is open, is completely located at the circumference of the inner pipe 2, and again passes through control homes 5, 5' of another side. The length is controlled as the above processes are performed repetitively. If the slider 6 is released with the inner pipe 2 drawn out or inserted by the user in a proper length, the slider 6 is returned to its original position by the restoring force of springs 11, 11' which have been compressed in one direction, and the switch 9 of the slider 6 closes the elevation ball 10 of the guide pipe 4 as in the beginning.

Therefore, the stopper 7 which is hooked to any one of control

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homes 5, 5' selected is not raised any further in the elevation ball 10 by the switch 9 stopping the elevation ball 10, and its state of being hooked to control homes 5, 5' of the inner pipe 2 is fixedly maintained thus enabling selection of the length of the suction pipe 5 1.

The stopper 7 which is hooked to control homes 5, 5' of the inner pipe 2 is not raised in the closed elevation ball 10 but remains to be fixed although it is moved to draw the inner pipe 2 out of the out pipe 3 or to insert since the switch 9 of the slider 6 always stops 10 the elevation ball 10 unless the slider 6 is moved, and control homes 5, 5' of the inner pipe 2 and the guide pipe 4 which is fixedly combined to the out pipe 3 maintain the combination relationship in terms of the stopper 7 thus enabling selective control of the length of the suction pipe 1.

15 And springs 11, 11' which are elastically combined with caps 8, 8' of the slider 6 at both sides of the guide pipe 4 are stably and elastically combined by a fixture 13 formed in caps 8, 8' at both sides of the slider 6 without moving to ensure smooth manipulation of the slider 6 and to provide stable operation of the slider 6 for control 20 of the length. Also, caps 8, 8' at both sides of the slider 6 are interactively assembled by means of assembly protrusion 12 and concave assembly home 12a thus enabling their simple assembly and preventing idle running of the slider 6 and caps 8, 8' at both sides.

In the meantime, the stopper 7 which is installed in the 25 elevation ball 10 of the guide pipe 4, is raised in the elevation ball 10 according to movement of the slider 6, and is hooked to or released from control homes 5, 5' of the inner pipe 2 can have a circular pin type, oval pin type, or other types. In the present device, it is desirable to give stable workability to the device by forming the 30 stopper 7 in a lengthwise oval form to prevent the stopper 7 hooked to control homes 5, 5' when the elevation ball 10 is closed by the switch 9 of the slider 6 from moving up so that the state of being hooked is not released, and to hook or release the stopper 7 to or from control homes 5, 5' without completely departing from the 35 elevation ball 10 but moving up in the elevation ball 10 when the

elevation ball 10 is open from the switch 9 and the stopper 7 is released from the state of being hooked to control homes 5, 5' in contrast.

As shown in FIGS. 7a and 7b, if the slider 6a is moved in one direction in order to draw the out pipe 3 out of the inner pipe 2, the operational part 16 of the slider 6a compresses the spring 14' of one side while it is moved in one direction at the outer side of the guide pipe 4. As the spring 14' is compressed, the catching home 15 of one side is coincided with the elevation ball 10a, and the stopper 7a which is hooked to control homes 5, 5' of the inner pipe 2 is raised to the catching home 15' side through the elevation ball 10a and is detachable from control homes 15, 15'.

In other words, if the slider 6a is moved to one side as described in the above, the guide pipe 4 is moved naturally as the operational part 16 which is an integral part of the slider 6a is moved. The out pipe 3 to which the guide pipe 4 is combined is then moved, and the stopper 7a which has been hooked to control homes 5, 5' is positioned to the rear catching home 15 side of the bottom surface of the slider 6a through the elevation ball 10a along the circumference of the inner pipe 2. By controlling movement of the slider 6a, the out pipe 3 is moved from the inner pipe 2 as much as desired.

When drawing the out pipe 3 out of the inner pipe 2 by pushing the slider 6a in one direction as described in the above, the stopper 7a is moved as it is hooked or detached selectively to or from catching home 15 of the slider 6a and the control home 5, 5' side of the inner pipe 2. In other words, the stopper 7a is hooked to the catching home 15 of the slider 6a if the elevation ball 10a is located at the circumference of the inner pipe 2 through the elevation ball 10a which is formed in the operational part 16 of the guide pipe 4 moving along with the slider 6a, or is lowered to the control home 5, 5' side if the elevation ball 10a is located at control homes 5, 5' while moving. That is, the stopper 7a is instantaneously combined to either the catching home 15 or control 5, 5' side.

Therefore, a user desiring to extend the length of the suction

pipe 1 by drawing out the out pipe 3 from the inner pipe 2 can extend and control the length of the suction pipe 1 as desired by manipulating the slider 6a in the forward direction, moving the out pipe 3 as desired by pushing the guide pipe 4, and releasing the slider 6a, as the slider 6a is returned to its original position by the restoring force of the spring 14' which has been compressed at one side of the operational part 16 of the slider 6a, and the stopper 7a of the catching home 15 is hooked to control homes 5, 5' of the inner pipe 2 through the elevation ball 10a.

10 In the same way, a user desiring to reduce the length of the suction pipe 1 by inserting the out pipe 3 to the inner pipe 2 can reduce and control the length of the suction pipe 1 as described in the above by pulling the slider 6a in the opposite direction, compressing the spring 14 of the opposite side of the operational part 16, and moving the out pipe 3 to the inner pipe 2 side with the stopper 7a hooked to the catching home 15' contrary to the time of drawing out.

As described in the above, in the present device, it is possible to arbitrarily control the length of the suction pipe 1 in one-touch manipulation by simply holding and pushing the sliders 6, 6a in the desired direction or by simply releasing the sliders 6, 6a at a selected length as the out pipe 3 is moved in the desired direction or the out pipe 3 and inner pipe 2 are interactively fixed to each other, respectively.

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Industrial Applicability

As apparent from the foregoing, the present invention enables very simple control of the length of the suction pipe 1 in one-touch manipulation by stretching the out pipe 3 from the inner pipe 2 as desired. The present device is advantageous and effective in that the device ensures convenience in using of a vacuum cleaner to the maximum since the length of the suction pipe 1 may be arbitrarily controlled as desired due to its further simplified and convenient operation; removes inconvenience in keeping and moving the device since the suction pipe 1 may be reduced compactly; provides

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compact and clean appearance of the suction pipe 1 since the sliders 6, 6a which are means for variably controlling the length of the suction pipe are not of projected form but of planar form; contributes to the improvement of design of vacuum cleaners; and for
5 other reasons.

While the invention has been described in terms of a few preferred embodiments, those skilled in the art will recognize that the invention can be practiced with modification within the spirit and scope of the appended claims.

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Claims:

1. A suction pipe of a vacuum cleaner characterized by that the length of said suction pipe may be controlled arbitrarily by inserting or drawing out an out pipe to or from an inner pipe by:

5 elastically combining a first slider and a second slider to outer side of said out pipe in the lengthwise direction;

 moving said first slider and said second slider in one direction;

 detaching a first stopper and a second stopper from a first control home and a second control home of said inner pipe;

10 and having said first stopper and said second stopper combined with said first control home and said second control home of said inner pipe if said first and second sliders return to their original positions.

2. The suction pipe of a vacuum cleaner of claim 1 further
15 comprising:

 a guide pipe, of which projected part is fixedly combined with said out pipe and is guided to a concave guide inlet of said inner pipe, and is equipped with an elevation ball for up-and-down movement of said first stopper;

20 said first slider which is combined with a first cap and a second cap at both sides and is fixed to said out pipe, and to which a first spring and a second spring are elastically combined to said guide pipe side insider of said first and second caps;

 a switch which is formed at said first slider to open and close
25 said elevation ball as said first slider is moved; and

 a stopper which is built in said elevation ball and is hooked to or released from said first control home and said second control home of said inner pipe by being raised as said inner pipe is moved.

3. The suction pipe of a vacuum cleaner of claim 1 further
30 comprising:

 a guide pipe which is fixedly combined with one end of said out pipe of outer side of said inner pipe in which a multiple number of said first control home and said second control home are formed at a constant interval;

35 said second slider, in which an elevation ball in which a

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second stopper is raised from said first and second control homes of said inner pipe, and to which a first cap and a second cap are combined at both sides;

5 a first spring and a second spring which are elastically combined at both sides of a central operational part of second slider; and

a first catching home and a second catching home of said central operational part to which said second stopper, which is detached from said first and second control homes of said inner pipe
10 through said elevation ball of said guide pipe, is hooked and combined.

4. The suction pipe of a vacuum cleaner of claim 2, wherein said stopper is of a lengthwise oval pin shape and is hooked to or released from said first and second catching homes of said inner
15 pipe as said stopper is raised in said elevation ball of said guide pipe.

5. The suction pipe of a vacuum cleaner of claim 2 or claim 3, wherein said first and second sliders and said first and second caps at both sides are inserted and assembled interactively by means
20 of an assembly protrusion and a concave assembly home, and inside of said first and second caps is equipped with a preventive means of moving of said first and second springs which are elastically combined at both sides of said guide pipe.

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AMENDED CLAIMS

[received by the International Bureau on 21 December 1999 (21.12.99);
original claims 1-5 replaced by new claims 1-7 (2 pages)]

1. A suction pipe of a vacuum cleaner, the length of said suction pipe may be controlled by inserting or drawing out an outer pipe (3) to or from an inner pipe (2), comprising :

- a guide pipe (4) connected to the outer pipe (3) ;
- a sliding unit (6) , movable in relation to said guide pipe (4) in longitudinal direction of said outer pipe (3) ; and
- a stopper (7) hookable in at least two control homes (5, 5') formed in said inner pipe (2) and fixedly connecting said guide pipe (4) and said inner pipe (2)

characterized in that

- said stopper (7) is biased.

2. A suction pipe according to claim 1 characterized in that said stopper (7) is biased by a first spring (11).

3. A suction pipe according to claim 2 characterized in that a second spring (11') applies in an adjusted position of said suction pipe a spring force on said stopper (7) which is equivalent to the spring force of the first spring (11) but in opposite direction.

4. A suction pipe according to one of claims 1 to 3, characterized in that said stopper (7) is an oval pin.

5. A suction pipe according to claim 4 characterized in that said guide pipe (4) is formed with an aperture supporting said oval pin (7) wherein said oval pin (7) within said aperture can move up and down into a released and hooked position, respectively.

6. A suction pipe according to claim 4 or 5 characterized in that said slider unit (6) comprises a switch (9) facing said guide pipe (4) wherein said switch (9) hooking in an adjusted position of said outer pipe (3) said oval pin (7) in a control home (5, 5')

7. A suction pipe according to one of claims 1 to 6, characterized in that said slider unit (6) comprises on each outer end a cab (8, 8') coupling said first and second spring (11,11') elastically with said guide pipe (4).

STATEMENT UNDER ARTICLE 19 (1)

We are herein below briefly explaining the amendment and indicating impact that such amendment might have on the description and the drawings.

- Explaining the amendment :

The original claims 1 to 5 are replaced by the amended claims 1 to 7. In the new set of amended claims, any relevance related to the citations in the Search Report are excluded by neglecting embodiments of the drawings numerated from Fig 5 to Fig 7b. Therefore any invention mentioned on the drawings of Fig 5 to Fig 7b are not claimed in the new set of claims.

- Indicating impact on :

Drawings

Originally there were 9 drawings. According to the new set of amended claims, the embodiments of drawings numerated from Fig 1 to Fig 4 are only subjected to the new set of amended claims. The other drawings numerated from Fig 5 to Fig 7b are nothing to do with the new set of amended claims.

Specification

Consequently, any descriptions or illustrations in the specification related to the drawings numerated from Fig 5 to Fig 7b can be neglected according to the new set of amend claims.

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Fig 1

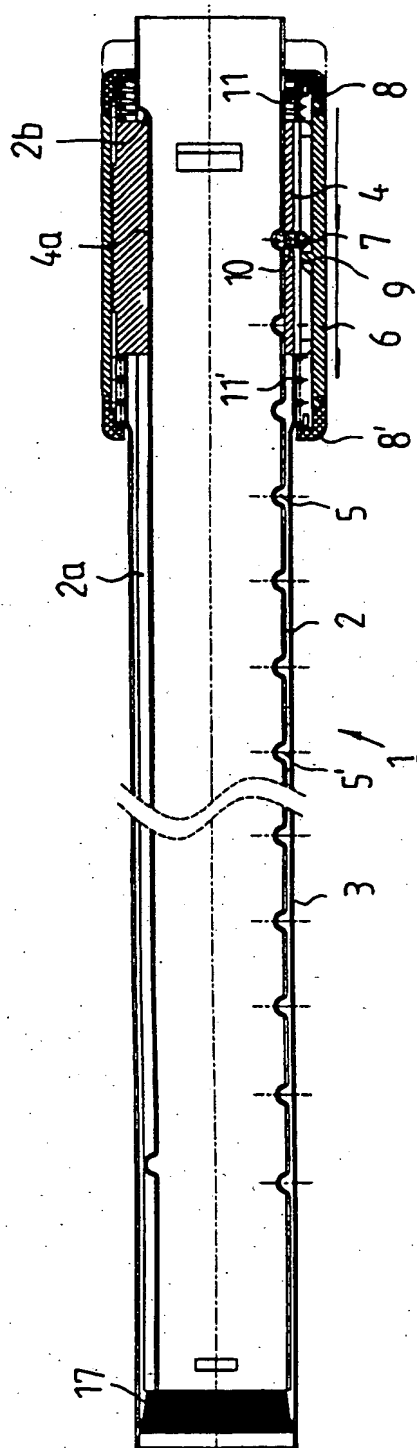
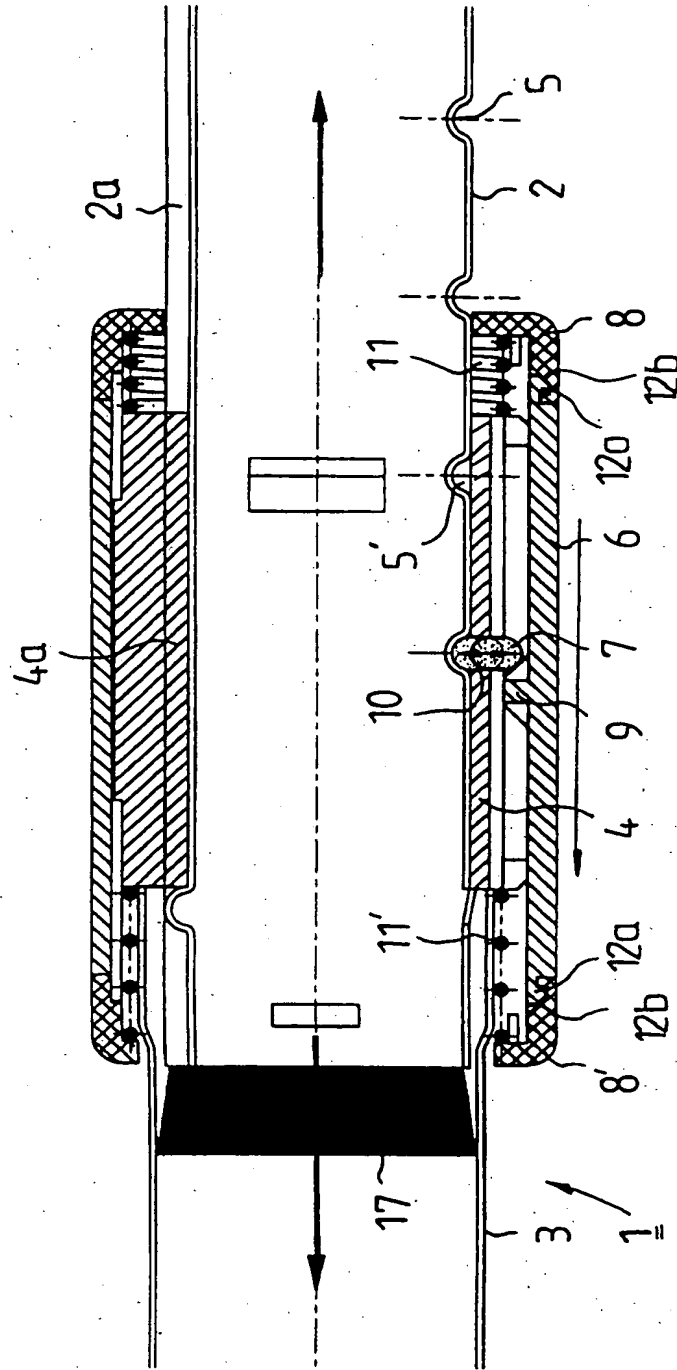


Fig 2



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Fig 4

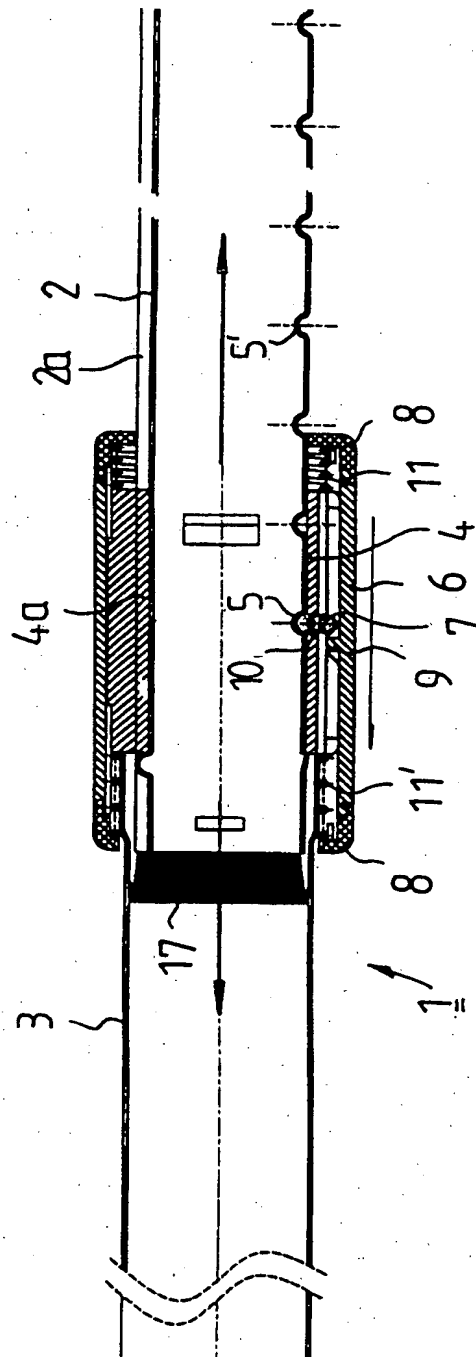


Fig 5

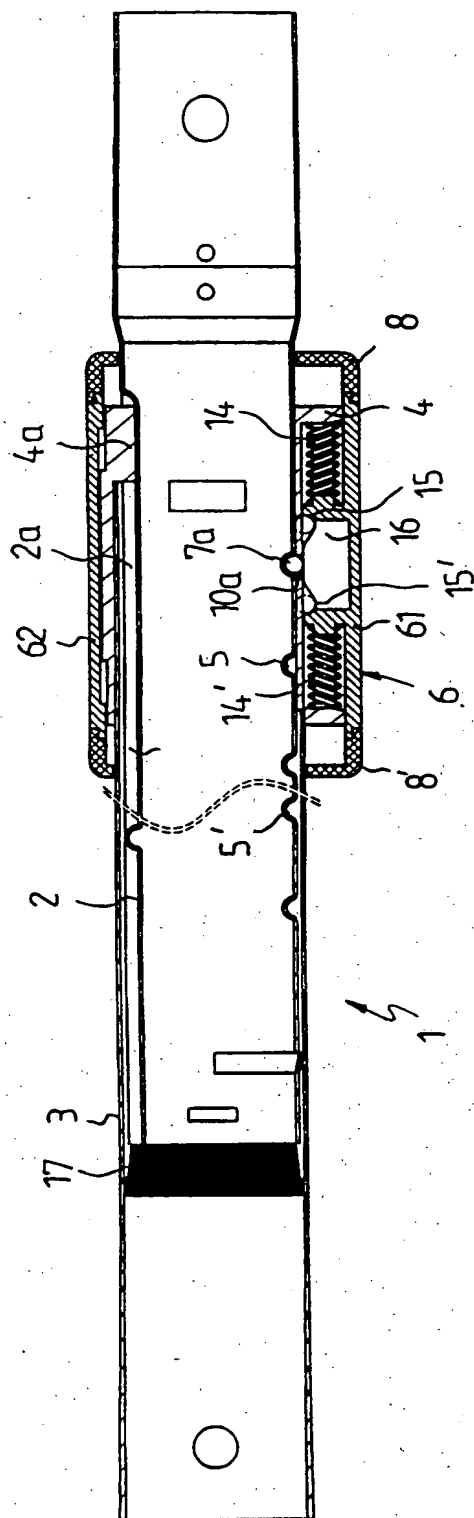


Fig 6

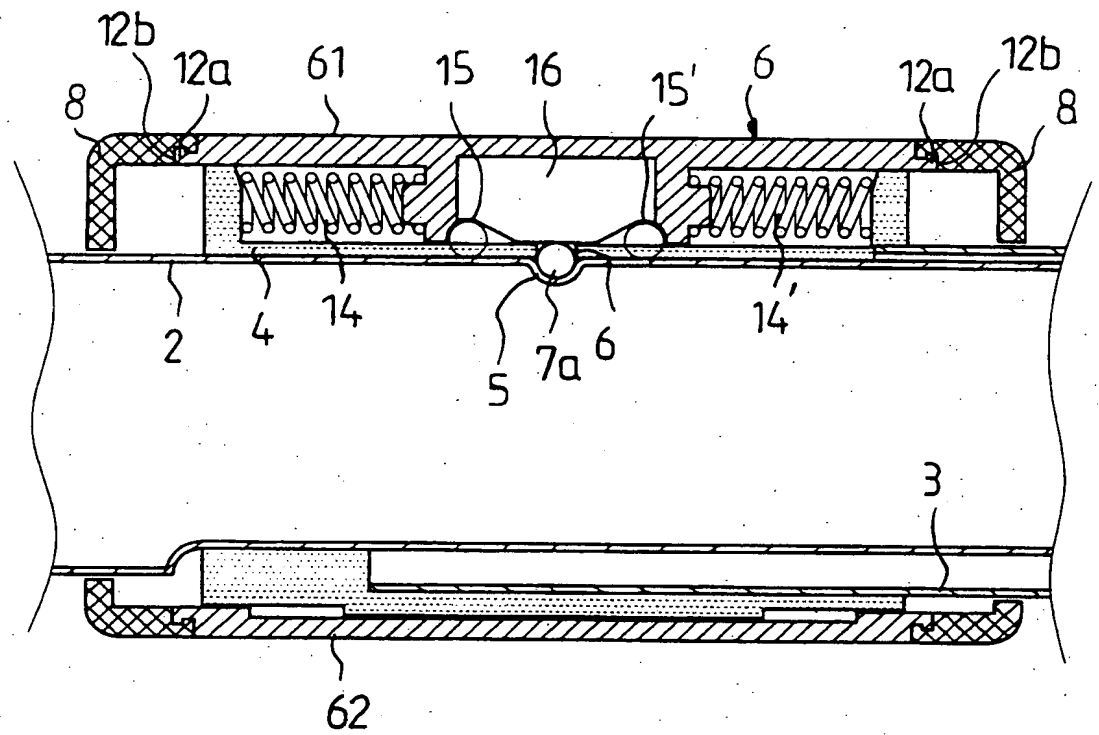


Fig 7a

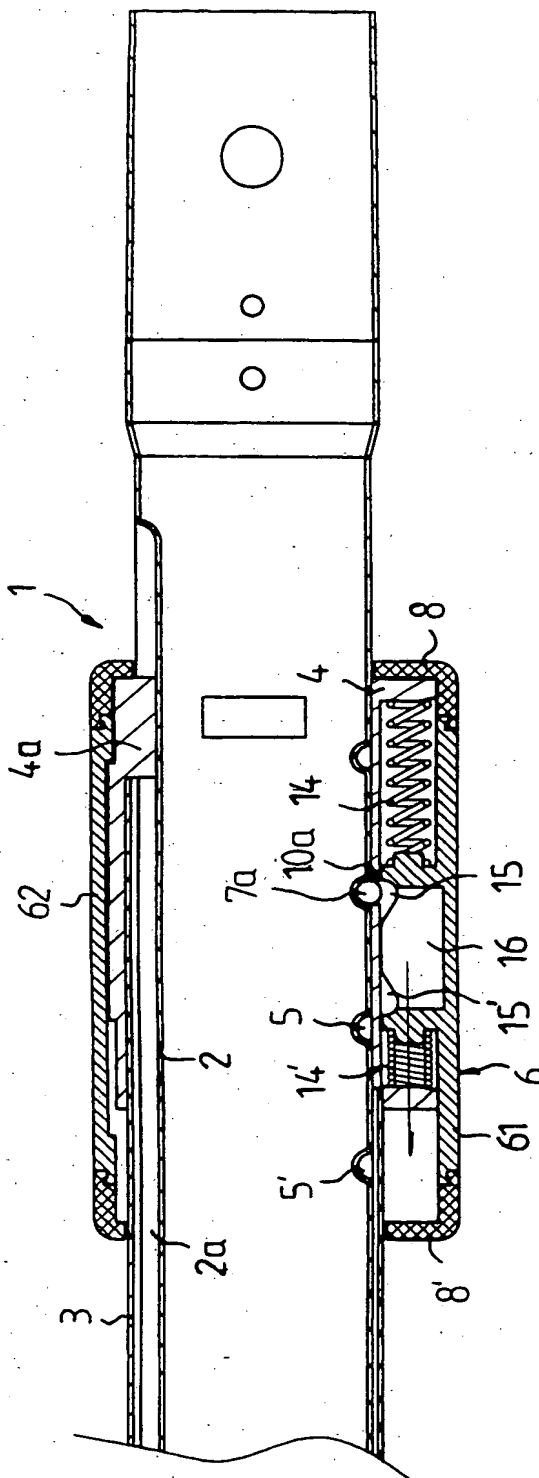
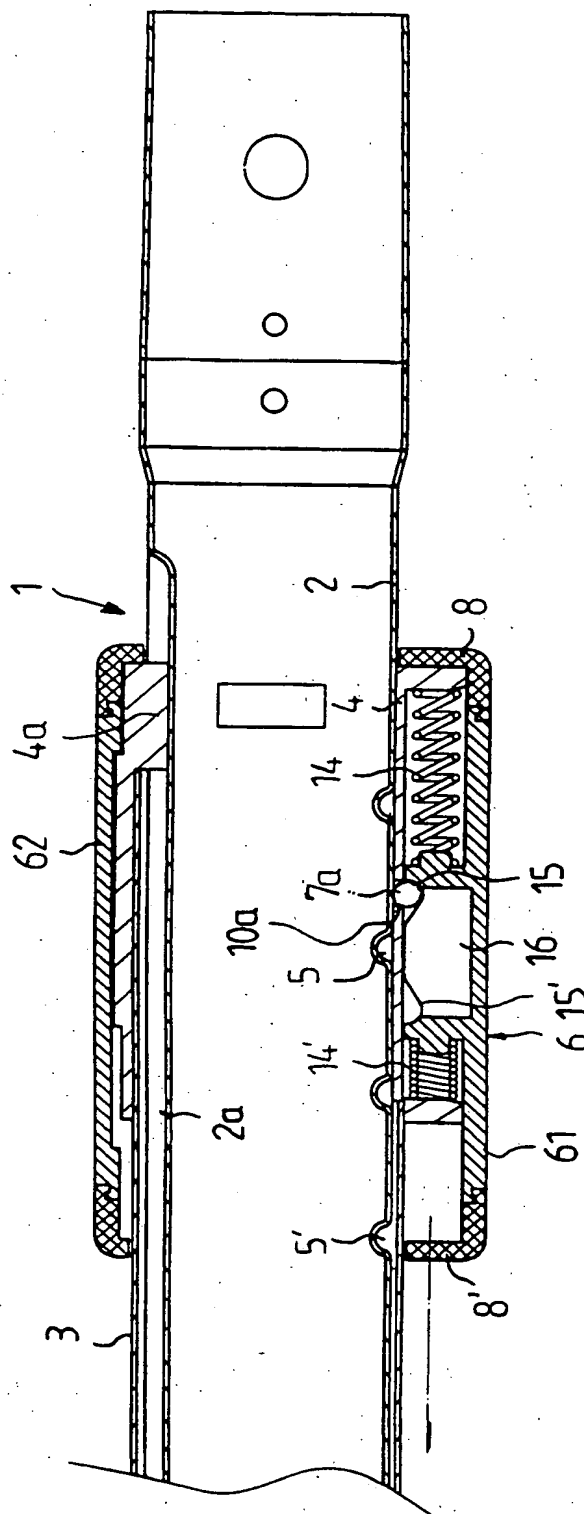


Fig 7b



INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR 99/00062

A. CLASSIFICATION OF SUBJECT MATTER

IPC⁷: A 47 L 9/24

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC⁷: A 47 L 9/24

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE 4200527 A1 (CARL FROH RÖHRENWERK GmbH & Co.) 22 July 1993 (22.06.93) fig. 1.	1-5
X	DE 4101049 A1 (MIELE) 23 July 1992 (23.07.92) fig. 1-3. -----	1-5

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents:

„A“ document defining the general state of the art which is not considered to be of particular relevance

„E“ earlier application or patent but published on or after the international filing date

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Date of the actual completion of the international search

06 October 1999 (06.10.99)

Date of mailing of the international search report

03 December 1999 (03.12.99)

Name and mailing address of the ISA/AT

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Authorized officer

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR 99/00062

The documents cited in the search report relate to vacuum cleaner pipes which may be telescopically adjusted and latched at any one of a number of desired lengths.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/KR 99/00062

Im Recherchenbericht angeführtes Patentedokument Patent document cited in search report Document de brevet cité dans le rapport de recherche	Datum der Veröffentlichung Publication date Date de publication	Mitglied(er) der Patentfamilie Patent family member(s) Membre(s) de la famille de brevets	Datum der Veröffentlichung Publication date Date de publication
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